

CLAIMS

1 1. A method of encoding data in an optical signal including a center wavelength, the
2 method comprising:
3
4 directing the optical signal through a filter mechanism having a passband function
5 including a center wavelength; and
6
7 modulating the center wavelength of the optical signal to establish a difference between
8 the center wavelengths of the filter mechanism and the optical signal to represent a data
9 value.

1 2. A method according to Claim 1, wherein the modulating step includes the steps of:
2
3 generating a feedback signal representing the difference between the center wavelengths
4 of the filter mechanism and the optical signal; and
5
6 using said feedback signal in a feedback loop to modulate the center wavelength of the
7 optical signal to establish said difference between said center wavelengths.

1 3. A method according to Claim 2, wherein the modulating step further includes the
2 steps of:
3
4 generating a dither signal; and
5
6 using the dither signal to modulate the center wavelength of the optical signal to
7 establish said difference between said center wavelengths.

1 4. A method according to Claim 3, wherein the step of using the feedback signal
2 includes the step of using the feedback signal to adjust the dither signal.

1 5. A method according to Claim 1, further including the step of modulating the optical
2 signal to carry a first set of data, and wherein the step of modulating the center
3 wavelength of the optical signal includes the step of modulating the center wavelength of
4 the optical signal to carry a second set of data.

1 6. A method according to Claim 5, wherein the optical signal is used in optical
2 network, and the second set of data are information for controlling the transmission of
3 optical signals within the network.

1 7. A method according to Claim 1, wherein the data are encoded according to one or
2 more protocols selected from the group comprising:

3
4 Multi-Protocol Label Switching (MPLS), Tag Switching, Digital Wrapper, Digital
5 Encapsulation, or related protocols.

1 8. A method according to Claim 1, wherein:

2
3 the encoded data are analog data; and the modulating step includes the steps of

4
5 i) providing a look-up table having wavelength differences associated with data values,

6
7 ii) value, obtaining from the look-up table a wavelength difference for a given data
8 value, and

9
10 iii) encoding the given data value in the optical signal by establishing the obtained
11 difference between the center wavelengths of the filter mechanism and the optical signal.

1 9. Apparatus for encoding data in an optical signal, comprising:

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3 a filter mechanism having a passband function including a center wavelength;
4

5 a mechanism for generating an optical signal including a center wavelength and for
6 directing the optical signal to the filter mechanism; and
7

8 a modulation system to modulate the center wavelength of the optical signal to establish
9 a difference between the center wavelengths of the filter mechanism and the optical
10 signal to represent a data value.

1 10. Apparatus according to Claim 9, wherein the modulation system includes a feedback
2 circuit to generate a feedback signal representing the difference between the center
3 wavelengths of the filter mechanism and the optical signal, and to use said feedback
4 signal to modulate the center wavelength of the optical signal to establish said difference
5 between said center wavelengths.

1 11. Apparatus according to Claim 10, wherein the mechanism for generating the optical
2 signal includes a dither generator for generating a dither signal, and means for applying
3 the dither signal to modulate the center wavelength of the optical signal to establish said
4 difference between said center wavelengths.

1 12. Apparatus according to Claim 11, wherein the feedback circuit includes means to use
2 the feedback signal to adjust the dither signal.

1 13. A method of decoding an optical signal including a center wavelength, the method
2 comprising:
3
4 receiving the optical signal;
5
6 passing the optical signal through a filter mechanism having a passband function
7 including a center wavelength;

8

9 generating a difference signal representing the difference between the center
10 wavelengths of the optical signal and the filter mechanism; and
11
12 converting said difference signal to a data value.

1 14. A method according to Claim 13, wherein a dither signal is used to encode data in
2 the optical signal, and the converting step includes the steps of processing said dither
3 signal with said difference signal to obtain a processed difference signal, and converting
4 said processed difference signal to the data value.

1 15. Apparatus for decoding an optical signal including a center wavelength,
2 comprising:

3
4 a filter mechanism having a passband function including a center wavelength;
5
6 means for receiving the optical signal and passing the optical signal through the filter
7 mechanism;
8
9 a circuit for generating a difference signal representing the difference between the center
10 wavelengths of the optical signal and the filter mechanism; and
11
12 a control for converting said difference signal to a data value.

1 16. Apparatus according to Claim 15, wherein a dither signal is used to encode data in
2 the optical signal, and said circuit includes a subcircuit for processing said dither signal
3 with said difference signal to obtain a processed difference signal, and said control
4 includes means for converting said processed difference signal to the data value.

1 17. A method of processing an optical signal including a center wavelength, comprising:

2
3 modulating the center wavelength of the optical signal to establish a difference between
4 the center wavelength and a predefined wavelength to encode a data in the optical signal;
5
6 transmitting the optical signal to a receiving device; and
7
8 using the receiving device to process the optical signal to identify the encoded data.

1 18. A method according to Claim 17, wherein the using step includes the steps of:

2
3 at the receiving device,
4
5 a. generating a difference signal representing the difference between the center
6 wavelengths of the optical signal and a defined value, and
7
8 b. converting the difference signal to a data value.

1 19. Apparatus for processing an optical signal, including a center wavelength,
2 comprising
3
4 a transmit device for modulating the center wavelength of the optical signal to establish
5 a difference between the center wavelength and a predefined wavelength to encode data
6 in the optical signal, and to transmit the optical signal; and
7
8 a receive device for receiving the optical signal from the transmit device and to process
9 the optical signal to identify the encoded data.

1 20. Apparatus according to Claim 19, wherein the receive device includes:

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- 3 a first circuit to generate a difference signal representing the difference between the
- 4 center wavelength of the optical signal and a defined value, and
- 5
- 6 a second circuit to convert the difference signal to a data value.